

SEASONAL SPAWNING CYCLE OF  
THE LONGFIN SANDDAB,  
*CITHARICHTHYS XANTHOSTIGMA*  
(BOTHIDAE)

This note contains the first description of the seasonal spawning cycle of the longfin sanddab, *Citharichthys xanhostigma*. This fish is common off southern California, but rare north of Santa Barbara and occurs at depths from 2 to 201 m (Miller and Lea 1976).

Methods

Fish were collected by otter trawl off the coast of southern California at depths of 45-64 m from San Clemente (lat. 33°20'N, long. 117°38'W) to Huntington Beach (lat. 33°40'N, long. 118°00'W). Collections were made during January-December 1978. Only females were examined. Specimens were immediately slit along the abdomen and placed in 10% Formalin<sup>1</sup>. Ovarian histological sections from 137 *C. xanhostigma* were cut at 8 μm and stained with iron hematoxylin. Seasonal gonosomatic indices (ovary wt/fish wt × 100) were calculated from preserved fish. Ovaries were classified histologically into four stages (Table 1).

TABLE 1.—Monthly distribution of body sizes (SL) and stages in *Citharichthys xanhostigma* spawning cycle, January-December 1978.

Month	N	Range (mm)	Regressed or regressing (%)	Previtellogenic (%)	Vitellogenic (%)	Spawning (%)
January	12	127-162	8	0	0	92
February	17	107-162	0	6	6	88
April	14	144-190	79	0	0	21
May	17	115-180	82	0	0	18
June	20	110-181	95	0	0	5
July	21	137-210	100	0	0	0
October	18	116-190	44	28	28	0
December	18	115-160	17	17	11	55

Results

Most *C. xanhostigma* spawn in winter (Table 1). At this time the majority of females contain yolk-filled oocytes (>290 μm in diameter) and gonosomatic indices reach their highest values (Fig. 1). Females were in spawning condition in December. The presence of mature (yolk-filled)

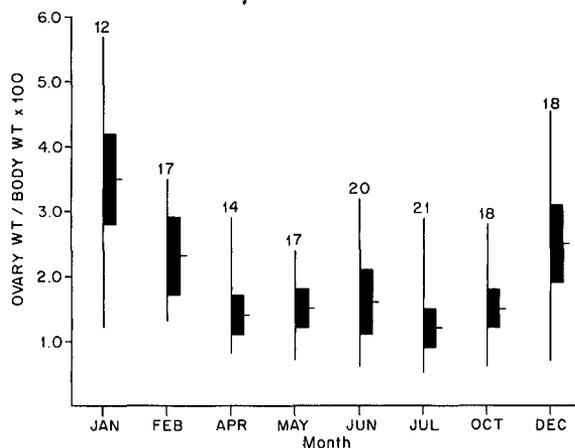


FIGURE 1.—Seasonal gonosomatic indices for *Citharichthys xanhostigma*. Vertical line = range; horizontal line = mean; rectangle = 95% confidence interval. Sample size above each month.

oocytes from an incipient spawning, and of post-ovulatory follicles which are remnants of the follicular walls of recently spawned oocytes (Hunter and Goldberg 1980), and of maturing oocytes for a subsequent spawning in the same ovary indicated that *C. xanhostigma* spawns more than once each season. The number of spawnings per season is unknown, however. Post-ovulatory follicles were similar to those of other teleost fishes (Hunter and Goldberg 1980). The smallest mature (ripe) female measured 107 mm SL (standard length); the largest, 181 mm SL. Miller and Lea (1976) reported this species may reach 250 mm TL (total length).

The incidence of spawning females decreased in spring. At this time most females contained regressed ovaries (Table 1) consisting of primary oocytes (53 μm) or regressing ovaries in which oocytes in various stages of vitellogenesis were undergoing atresia. Ovaries from fish taken during July were regressed, and gonosomatic indices were reduced (Fig. 1). Ovarian activity for the new spawning cycle began during autumn. This was apparent in October (Table 1) when previtellogenic females containing slightly enlarged, vacuolated oocytes (118 μm) and vitellogenic females (yolk deposition in enlarging oocytes) were present.

Discussion

My data have shown *C. xanhostigma* is a winter spawner in southern California. Spawning

<sup>1</sup>Reference to trade names does not imply endorsement by the National Marine Fisheries Service, NOAA.

times in other California flatfishes are variable with a tendency toward winter. Fitch and Lavenberg (1971) reported the following spawning periods: *Platichthys stellatus*, November-February; *Microstomus pacificus*, November-March; *Citharichthys sordidus*, July-September; *Paralichthys californicus*, February-July. Goldberg (1981) reported summer spawning in *Symphurus atricauda* and summer-fall spawning (Goldberg 1982) in *Hippoglossina stomata*. Spawning in *Citharichthys stigmaeus* occurs April-September (Ford 1965). *Pleuronichthys verticalis* which was investigated by Fitch (1963) and Goldberg (1982) and *Glyptocephalus zachirus* which Frey (1971) reported on were in spawning condition throughout the year. Such year-round spawning is uncommon among California flatfishes.

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#### OTTER TRAWL SAMPLING BIAS OF THE GILL PARASITE, *LIRONECA VULGARIS* (ISOPODA, CYMOTHOIDAE), FROM SANDDAB HOSTS, *CITHARICHTHYS* SPP.

*Lironeca vulgaris* (Crustacea, Isopoda, Cymothoidae) is a common parasite infesting the gill chambers of many marine fish species from the California coast. Both male and female isopods reside in the gill chambers of sanddab hosts. Aspects of the ecology of this parasite and host specificity are given in Brusca (1978, 1981) and Keusink (1979). Both authors discuss the propensity of isopods, particularly males, to abandon hosts in otter trawls, which may cause false host records. Further, if host abandonment occurs during the trawling operation then estimates of prevalence (no. of infested hosts/total no. of hosts), relative parasite density (total no. of parasites/total no. of hosts), and mean parasite intensity (total no. of parasites/no. of infested hosts) will be biased. During a study of the interactions between *L. vulgaris* and two sanddab hosts, *Citharichthys stigmaeus* and *C. sordidus*, I analyzed the efficiency of traditional otter trawl collecting methods. Prevalence, relative parasite density, and mean parasite intensity were compared for samples of a host population gathered by otter trawls and divers utilizing scuba.

#### Methods

Speckled sanddabs, *Citharichthys stigmaeus*, and Pacific sanddabs, *C. sordidus*, were collected from a site about 0.5 km west of Goleta Point, Santa Barbara County, Calif., just seaward of an extensive bed of giant kelp, *Macrocystis pyrifera*. The depth was 16 m and the substrate consisted of fine sands and silts with occasional stands of the brown alga, *Pterygophora californica*, and patches of eelgrass, *Zostera marina*.